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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,387	07/17/2003	Geoffrey Wehrman	1252.1071CIP3	8762

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BAKER BOTTS L.L.P.
2001 ROSS AVENUE
SUITE 600
DALLAS, TX 75201-2980

EXAMINER	
BLACK, LINH	
ART UNIT	PAPER NUMBER
2159	

NOTIFICATION DATE	DELIVERY MODE
09/30/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptomail1@bakerbotts.com
glenda.orrantia@bakerbotts.com

Office Action Summary	Application No.	Applicant(s)	
	10/620,387	WEHRMAN ET AL.	
	Examiner	Art Unit	
	LINH BLACK	2159	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 July 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This communication is responsive to the Applicants' arguments dated 7/9/09. Claims 1-12 are pending in the application. Claims 1, 5, 9-10 are independent claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang et al. (US 6453354) in view of Manczak (US 2002/0161855).

As per claims 1, 10, Jiang et al. teach

initiating an operation on the virtual metadata; locking the virtual metadata during execution of the operation; beginning execution of the operation on the virtual metadata – col. 10, lines 7-20; col. 29, line 65 to col. 30, line 41.

determining whether the virtual metadata is under hierarchical storage management - col. 30, lines 41-55; col. 33, line 57 to col. 34, line 20 (Universal File System has the hierarchical directory structure: figs. 22-23 with virtual nodes and shadow file systems).

releasing a lock on the virtual metadata in response to relocation of the metadata during execution of the operation on the virtual metadata – col. 27, line 59 to col. 28 (a shared lock gives a data mover the permission to read the file, while an exclusive lock gives the data mover…to modify and its metadata…or the secondary data mover itself releases the lock voluntarily…release); col. 29, line 65 to col. 30, line 40 (if a secondary data mover modifies the file and as a result the file's metadata is changed, it will increase the version number, when it releases the lock, it will tell the Owner about the new metadata...The version number is exchanged and compared to make sure that every data mover always caches and operates on the most up to date version of the metadata, so that the exchange or metadata from a secondary data mover to the Owner follows release consistency, and the exchange of metadata from an Owner to a secondary data mover follows entry consistency); col. 35, lines 49-57.

However, Jiang et al. seems not suggest determining whether a metadata server maintaining the virtual metadata is to be relocated during execution of the operation. Manczak discloses metadata and data storage including hierarchical storage management – fig. 5; distributed metadata service made up of one or more metadata servers – par. 22; the virtual metadata being under hierarchical storage management – pars. 48- 54; determining whether a metadata server maintaining the virtual metadata is to be relocated during execution of the operation – pars. 30-31 (in general, each GS node need not be aware of the other GS nodes and need not keep any state about other nodes, and each BSS node need not be aware of the other BSS nodes and need not keep any state

about other nodes. However, each of the GS nodes can communicate with any other node and all BSS to nodes can communicate between each other. One advantage of not keeping any state about other nodes is that nodes can be transparently added to or removed from the GS and the BSS…adding GS nodes improves performance of the system by increasing the Gateway service processing resources, while adding BSS nodes increases capacity of the system...Unlike the case of a traditional file server, the system performance and capacity are not limited by performance or capacity of any single server...the metadata associated with stored bitfiles from all of the bitfile storage servers is stored in metadata server and its associated disk storage; "All metadata associated with data stored in data storage network 300 is stored by for example and without limitation MDS 315 on Metadata Server 316 and disk 218…If the data is modified as a result of the access…the metadata is correspondingly updated" - pars. 34-35; "…scalable means that any system resource can be increased by adding more nodes. Redundant means that any system resource can remain available even if any of its components fail. Scalable and redundant file storage system 400 includes a scalable and redundant Gateway Service 410, and a scalable and redundant Metadata Service 420… the ability to migrate data transparently further enables usage of the symmetric shared file storage system according to the invention as a hierarchical storage management (HSM) system..." – pars. 43-45; data migration and mirroring, these operations can be initiated manually or automatically and transparent to the users – pars. 51-55. Therefore, with either a failure of a metadata server or adding of a new metadata

server in which a relocation of metadata or metadata server will be transparent to users based on redundancy and scalability of metadata service. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Jiang's teaching with Manczak's teaching in order to allow the flexibility in computer file systems in terms of data reliability and increasing in capacity.

As per claims 2, 11, Jiang et al. teach

Examiner checked the application's specification and drawings and did not find a definition for "a private data chain". The Microsoft Computer Dictionary – Fourth Edition cites data chaining as "the process of storing segments of data in noncontiguous locations while retaining the ability to reconnect them in the proper sequence."

wherein the virtual metadata is formed as a private data chain; locking a pointer to the private data chain prior to linking to a first item of private data in the private data chain – col. 8, line 52 to col. 9, line 14; col. 11, lines 14-32; col. 31, last paragraph.

As per claims 3, 12, Jiang et al. teach

waiting, after said releasing, for availability of a lock on the pointer to the private data chain upon completion of relocation of the metadata server, before continuing with execution of operations on the virtual metadata – col. 27, line 32 to col. 28, line 15; col. 29, lines 9-41. However Jiang does not explicitly disclose

the limitation “metadata server”. Manczak discloses metadata and data storage including hierarchical storage management – fig. 5; distributed metadata service made up of one or more metadata servers – par. 22; the virtual metadata being under hierarchical storage management – pars. 48- 54. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Jiang’s teaching with Manczak’s teaching in order to allow metadata storages such as metadata servers be utilized.

As per claim 4, Jiang et al. teach

wherein said releasing, waiting and continuing execution of operations on the virtual metadata after relocation of the metadata server are performed transparently to users – col. 13, last paragraph; col. 17, line 39 to col. 18, line 10; col. 19, last paragraph; col. 27, lines 49-59. However Jiang does not explicitly disclose the limitation “metadata server”. Manczak discloses metadata and data storage including hierarchical storage management – fig. 5; distributed metadata service made up of one or more metadata servers – par. 22; the virtual metadata being under hierarchical storage management – pars. 48- 54; “All metadata associated with data stored in data storage network 300 is stored by for example and without limitation MDS 315 on Metadata Server 316 and disk 218…If the data is modified as a result of the access…the metadata is correspondingly updated" - pars. 34-35; “…scalable means that any system resource can be increased by adding more nodes. Redundant means that any system resource

can remain available even if any of its components fail. Scalable and redundant file storage system 400 includes a scalable and redundant Gateway Service 410, and a scalable and redundant Metadata Service 420… the ability to migrate data transparently further enables usage of the symmetric shared file storage system according to the invention as a hierarchical storage management (HSM) system..." – pars. 43-45; data migration and mirroring, these operations can be initiated manually or automatically and transparent to the users – pars. 51-55. Therefore, with either a failure of a metadata server or adding of a new metadata server in which a relocation of metadata or metadata server will be transparent to users based on redundancy and scalability of metadata service. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Jiang's teaching with Manczak's teaching in order to allow the flexibility in computer file systems in terms of data reliability and increasing in capacity.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang et al. (US 6453354), in view of Manczak et al. (US 20020161855) and further in view of Cabrera et al. (US 6981005).

As per claim 5, Jiang et al. teach

retargeting objects on the computer system nodes accessing a current metadata computer to a new metadata computer – col. 3, lines 59 to col. 4, line 15 (network file server system with data movers and network clients); fig. 4, items 1-4, 81-82, metadata in file server 60 which is further described at col. 10, lines 20-67; col. 29, line 43 to col. 30, line 41.

initiating an operation on the virtual metadata; locking the virtual metadata during execution of the operation; beginning execution of the operation on the virtual metadata – col. 10, lines 7-20; col. 29, line 65 to col. 30, line 41.

releasing a lock on the virtual metadata in response to initiating relocation of the metadata server during execution of the virtual metadata – col. 8, last paragraph to col. 9, line 14; col. 27, line 59 to col. 28 (a shared lock gives a data mover the permission to read the file, while an exclusive lock gives the data mover…to modify and its metadata…or the secondary data mover itself releases the lock voluntarily…release.); col. 29, line 65 to col. 30, line 40 (if a secondary data mover modifies the file and as a result the file's metadata is changed, it will increase the version number, when it releases the lock, it will tell the Owner about the new metadata...The version number is exchanged and compared to make sure that every data mover always caches and operates on the most up to

date version of the metadata, so that the exchange or metadata from a secondary data mover to the Owner follows release consistency, and the exchange of metadata from an Owner to a secondary data mover follows entry consistency); col. 35, lines 49-57. However, Jiang et al. seems not suggest a metadata server is relocated during execution of the virtual metadata.

Manczak discloses metadata and data storage including hierarchical storage management – fig. 5; distributed metadata service made up of one or more metadata servers – par. 22; a metadata server is relocated during execution of the virtual metadata – pars. 30-31 (in general, each GS node need not be aware of the other GS nodes and need not keep any state about other nodes, and each BSS node need not be aware of the other BSS nodes and need not keep any state about other nodes. However, each of the GS nodes can communicate with any other node and all BSS to nodes can communicate between each other. One advantage of not keeping any state about other nodes is that nodes can be transparently added to or removed from the GS and the BSS…adding GS nodes improves performance of the system by increasing the Gateway service processing resources, while adding BSS nodes increases capacity of the system...Unlike the case of a traditional file server, the system performance and capacity are not limited by performance or capacity of any single server...the metadata associated with stored bitfiles from all of the bitfile storage servers is stored in metadata server and its associated disk storage; “All metadata associated with data stored in data storage network 300 is stored by for example and without limitation MDS 315 on Metadata Server 316 and disk

218…If the data is modified as a result of the access…the metadata is correspondingly updated" - pars. 34-35; "…scalable means that any system resource can be increased by adding more nodes. Redundant means that any system resource can remain available even if any of its components fail. Scalable and redundant file storage system 400 includes a scalable and redundant Gateway Service 410, and a scalable and redundant Metadata Service 420… the ability to migrate data transparently further enables usage of the symmetric shared file storage system according to the invention as a hierarchical storage management (HSM) system..." – pars. 43-45; data migration and mirroring, these operations can be initiated manually or automatically and transparent to the users – pars. 51-55. Therefore, with either a failure of a metadata server or adding of a new metadata server/relocating of the current metadata server to the new metadata server, the relocation of metadata or metadata server will be transparent to users based on redundancy and scalability of metadata service. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Jiang's teaching with Manczak's teaching in order to allow the flexibility in computer file systems in terms of data reliability and increasing in capacity.

However, Jiang and Manczak do not disclose the implementation of DMAPI. Cabrera teaches hierarchical storage management systems, migrating of data to other storage location and preserves the relationships between the migrated data and the stream of data via metadata – col. 5, lines 7-67; network client and server computers - col. 7, last paragraph; an application programming

interface for data migration - claims 28-29. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Jiang's teaching with Manczak's and Cabrera's teachings in order to efficiently allow data migrating between computers/servers efficiently.

Claims 6-8 claim the same subject matter as of claims 2-4 and are rejected based on the same ground of rejection.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang et al. (US 6453354), in view of Manczak et al. (US 20020161855).

As per claim 9, Jiang et al. teach

storage devices storing at least one file; network coupled to said storage devices – col. 1, lines 9-10; fig. 4; col. 38, lines 14-23.

at least one metadata server node, coupled to said network – fig. 3, items 60-71; col. 2, lines 18-49 (whenever the data mover computer receives a file access request from the client, it checks the configuration directory to determine whether or not the file is in a file system owned by the data mover. Thus, the data mover acts as "a metadata server node").

metadata in file server 60 which is further described at col. 9, line 54 to col. 10, line 19.

at least one metadata client node, coupled to said storage area network -

initiating an operation on the virtual metadata; locking the virtual metadata during execution of the operation; beginning execution of the operation on the virtual metadata – col. 10, lines 7-20; col. 29, line 65 to col. 30, line 41.

determining whether the virtual metadata is under hierarchical storage management - col. 30, lines 41-55; col. 33, line 57 to col. 34, line 20 (Universal File System has the hierarchical directory structure: figs. 22-23 with virtual nodes and shadow file systems).

release a lock on the virtual metadata in response to relocation of said at least one metadata server during execution of the operation on the virtual metadata - fig. 3 where clients interchange metadata with file server 60; col. 27, line 59 to col. 28 (a shared lock gives a data mover the permission to read the file, while an exclusive lock gives the data mover…to modify and its metadata…or the secondary data mover itself releases the lock voluntarily…release); col. 29, line 65 to col. 30, line 40 (if a secondary data mover modifies the file and as a result the file's metadata is changed, it will increase the version number, when it releases the lock, it will tell the Owner about the new metadata...The version number is exchanged and compared to make sure that every data mover always caches and operates on the most up to date version of the metadata, so that the exchange or metadata from a secondary data mover to the Owner follows release consistency, and the exchange of metadata from an Owner to a secondary data mover follows entry consistency); col. 35, lines 49-57.

However, Jiang does not disclose a SAN and determining whether a metadata server maintaining the virtual metadata is to be relocated during execution of the operation. Manczak teaches file storage system using SAN technology – par. 12; migrate file data between nodes – par. 30; metadata and data storage including hierarchical storage management – fig. 5; distributed metadata service made up of one or more metadata servers – par. 22; the virtual metadata being under hierarchical storage management – pars. 48- 54; determining whether a metadata server maintaining the virtual metadata is to be relocated during execution of the operation – pars. 30-31 (in general, each GS node need not be aware of the other GS nodes and need not keep any state about other nodes, and each BSS node need not be aware of the other BSS nodes and need not keep any state about other nodes. However, each of the GS nodes can communicate with any other node and all BSS to nodes can communicate between each other. One advantage of not keeping any state about other nodes is that nodes can be transparently added to or removed from the GS and the BSS…adding GS nodes improves performance of the system by increasing the Gateway service processing resources, while adding BSS nodes increases capacity of the system...Unlike the case of a traditional file server, the system performance and capacity are not limited by performance or capacity of any single server...the metadata associated with stored bitfiles from all of the bitfile storage servers is stored in metadata server and its associated disk storage; “All metadata associated with data stored in data storage network 300 is stored by for example and without limitation MDS 315 on Metadata Server 316

and disk 218…If the data is modified as a result of the access…the metadata is correspondingly updated" - pars. 34-35; "…scalable means that any system resource can be increased by adding more nodes. Redundant means that any system resource can remain available even if any of its components fail. Scalable and redundant file storage system 400 includes a scalable and redundant Gateway Service 410, and a scalable and redundant Metadata Service 420… the ability to migrate data transparently further enables usage of the symmetric shared file storage system according to the invention as a hierarchical storage management (HSM) system..." – pars. 43-45; data migration and mirroring, these operations can be initiated manually or automatically and transparent to the users – pars. 51-55. Therefore, with either a failure of a metadata server or adding of a new metadata server in which a relocation of metadata or metadata server will be transparent to users based on redundancy and scalability of metadata service; fig. 3, items 302-308 connecting to networks and metadata servers. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Jiang's teaching with Manczak's teaching in order to allow the flexibility in computer file systems in terms of data reliability and increasing in capacity and to allow efficient communication between computer data nodes.

Response to Arguments

Applicant's arguments with respect to claims 1-12 have been considered but are not persuasive.

Regarding the Applicant's amended independent claims, please see the new combinations of references above regarding the arguments on the newly amended limitations.

Regarding the Applicant's arguments that Jiang fails to disclose any capability to relocate a metadata server let alone the release a lock on a virtual metadata in response to relocation. Examiner finds that Jiang discloses data network 70/80 with file server 60 and/or cached disk array 83-84, data movers 81-82 own the cached disk arrays and contain metadata of these file systems 1-2, thus the data movers seems act like metadata servers. In addition, metadata is communicated between the data movers – col. 9, line 54 to col. 10, line 67 or metadata is also cached on secondary data movers to improve performance...- col. 29, line 43 to col. 30, line 63. However, Jiang et al. seems not suggest a metadata server is relocated during execution of the virtual metadata.

Manczak discloses metadata and data storage including hierarchical storage management – fig. 5; distributed metadata service made up of one or more metadata servers – par. 22; a metadata server is relocated during execution of the virtual metadata – pars. 30-31 (in general, each GS node need not be aware of the other GS nodes and need not keep any state about other nodes, and each BSS node need not be aware of the other BSS nodes and need not keep any state about other nodes. However, each of the GS nodes can communicate with any other node and all BSS to nodes can communicate between each other. One advantage of not keeping any state about other nodes is that nodes can be transparently added to or removed from the GS and the

BSS…adding GS nodes improves performance of the system by increasing the Gateway service processing resources, while adding BSS nodes increases capacity of the system...Unlike the case of a traditional file server, the system performance and capacity are not limited by performance or capacity of any single server...the metadata associated with stored bitfiles from all of the bitfile storage servers is stored in metadata server and its associated disk storage; "All metadata associated with data stored in data storage network 300 is stored by for example and without limitation MDS 315 on Metadata Server 316 and disk 218…If the data is modified as a result of the access…the metadata is correspondingly updated" - pars. 34-35; "…scalable means that any system resource can be increased by adding more nodes. Redundant means that any system resource can remain available even if any of its components fail. Scalable and redundant file storage system 400 includes a scalable and redundant Gateway Service 410, and a scalable and redundant Metadata Service 420… the ability to migrate data transparently further enables usage of the symmetric shared file storage system according to the invention as a hierarchical storage management (HSM) system..." – pars. 43-45; data migration and mirroring, these operations can be initiated manually or automatically and transparent to the users – pars. 51-55. Therefore, with either a failure of a metadata server or adding of a new metadata server/relocating of the current metadata server to the new metadata server, the relocation of metadata or metadata server will be transparent to users based on redundancy and scalability of metadata service.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LINH BLACK whose telephone number is 571-272-4106. The examiner can normally be reached on Mon.-Thurs..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Trujillo can be reached on 571-272-3677. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LINH BLACK
Examiner
Art Unit 2159

/HUNG Q. PHAM/
Primary Examiner, Art Unit 2159
September 28, 2009